

Tropical Areas of Interest Discussion for August 13, 2010

Created 1800 UTC August 13, 2010

GRIP Forecast Team: Cerese English, Jon Zawislak, Matt Janiga, and Andrew Martin

Summary: A quiet Atlantic Basin has three tropical waves and ex-TD05/PGI-29L along the Gulf Coast. While much of the Gulf of Mexico and Florida are dominated by high pressure, convection along the southern LA boundary of the remnant convection associated with ex-TD05 flared all morning and afternoon (which provided the DC-8 in transit to FL with a good flight target, and a smooth landing is forecasted in Fort Lauderdale around 2100 UTC). There are four pouches currently being tracked, three associated with the tropical waves over the Atlantic and Africa, and one associated with ex-TD05, which continues to bear watching as the model consensus tracks the storm back over the Gulf of Mexico by Monday, 8/16.

Forecast for 1800 UTC 8/13/2010:

PGI25L returned to identification today after being discontinued yesterday (2). This system is at the northern extent of a wave located near 15N/62W (1). Little to no convection is present in the vicinity although it is embedded in a region of relatively high total precipitable water (3). Global models do not persist the pouch much beyond 36-48 hours as it moves further north into much less favorable environmental conditions (10). Based on observations and model forecasts, no development of this system is expected.

PGI27L is identified by a mid-level trough located at 20N/40W is currently associated with a weak shift in the winds but is not convectively active. As the disturbance continues to move eastward both the GFS and ECMWF do continue representing weak vorticity maxima. Convection and moisture are forecast to increase beyond 24 hr although none of the model guidance significantly intensifies this system. The disturbance became well defined on 8/9, 0000 UTC near 17.5W (14). It has been contending with dry air for the duration of its life. At 8/9 0000 UTC a pouch was identified at 12N, 31W. Currently, there is some cloud cover but no deep convection associated with the system (15) which as of 1200 UTC was located at 40W/20N. A weak shift in the winds is visible in the satellite derived winds. With a more robust shift and trough axis visible in the GFS analyses. Although, the system is very dry currently both the GFS and ECMWF are tracking a weak vorticity maxima westward so monitoring of the system should continue (14). In addition, the GFS and ECMWF are predicting a slow increase in convection and moisture over the next 72 hr (16, 17). By 72h (8/16 1200 UTC) a weak trough axis is forecast by the GFS to be at 60W/20N and experiencing between 10-20 kts of shear.

PGI-28L is currently located at 15N/12W. There is intense convection associated with this disturbance (4); however, the disturbance is forecast to move northeastward over the next 72 hr associated with a weakness in the east Atlantic mid-level ridge. Beyond 72 hr some part of the disturbance may continue moving westward as the ridge builds back in but should not develop due to the high shear and dry air surrounding the system. The disturbance became well defined on 8/9, 0000 UTC near 15E. Over the last few days the

African easterly wave has developed a strongly rotating center of deep convection currently located at 10W/ 17N (15). A weakness in the East Atlantic mid-level ridge near 12W/30N is causing all of the models to predict a northwestward track of the system over the next 72 hr. In addition, moisture is forecast to decrease as the disturbance encounters subsidence associated with the upper-level trough producing a weakness in the ridge. Beyond that time the GFS is predicting a rebuilding of the mid-level ridge. Although the majority of the vorticity associated with this disturbance appears to recurve northward in the guidance (18) there is some westward propagation of vorticity in the GFS which may be partly associated with this disturbance (14). However, all guidance is suggesting very dry air and high shear beyond 72 hr for the portion of this disturbance that does continue westward into the Atlantic.

PGI-29L/Ex-TD05 is located on the Gulf coast of Mississippi near 88.4W/30.7N and has widespread deep convective showers associated with it, and although a well-defined low-level circulation is no longer evident, there is a broad, E-W elongated low- to mid-level trough/vorticity maximum with an upper-level anticyclone centered over the southeast U.S (5). Therefore, vertical shear is fairly low over the main convective region of the disturbance. The model consensus is for the pouch to track northward over land before re-curving southward towards the Gulf (6,7). A trough currently over the northwest U.S. will lift as it tracks towards the east coast, leaving 29L in generally weak anticyclonic flow in the south central U.S. The consensus is for some model intensification (albeit weak) once the disturbance re-emerges into the Gulf at 84-96 hours. The consensus track is as follows: 14/0200 UTC: 86.9W/31.6N; 14/1400 UTC: 86W/32.3N; 15/0200 UTC: 85.2W/32.3N; 15/1400 UTC: 84.8W/32.3N; 16/0200 UTC: 84.8W/31.2N; 16/1400 UTC: 85.7W/30.3N; 17/0200 UTC: 87.2W/29.2N; 17/1400 UTC: 88.9W/29.5N. In terms of mission interest, a Global Hawk test flight on Tuesday/Wednesday in the Gulf may coincide with the re-emergence of the disturbance in the Gulf.

At 1200 UTC on 8/13/2010, low total Precipitable water values were present in most of the tropical east Atlantic north of 10N from 50W to near the African west coast (8). A trailing 6-hour composite of AMSU TPW shows values below 40 mm through the majority of this region (8). The GOES water vapor channel suggests that dry air is present at the upper levels as well. The dry east Atlantic air mass is largely dust-free except for a very dusty plume exiting West Africa north of 20N and a less optically thick aerosol optical thickness maxima extending from 20N/50W southeast to 10N/30W. Part of this second feature includes the location of PGI-27L. (11). It is possible that the dry air is currently suppressing convection in PGI-27L, however the vorticity structure of PGI-27L is fairly unimpressive and the dynamics could be contributing to the dearth of convection as well. Because there is little convection or even cloud cover in PGI-27L, dust microphysics are not currently an important factor in this system. Further to the east, the environment over Africa is currently very moist. METEOSAT water vapor imagery shows impressive upper level moisture near the southern and northern easterly wave tracks. (13). This includes the environment of PGI-28L. Unfortunately AMSU and MODIS products are not available over this area, but PGI-28L is entering the Sahara desert and is likely picking up high levels of dust from the surface. A 1200 UTC sounding from Dakar, Senegal shows a fairly moist (dew point temperatures > 20 C)

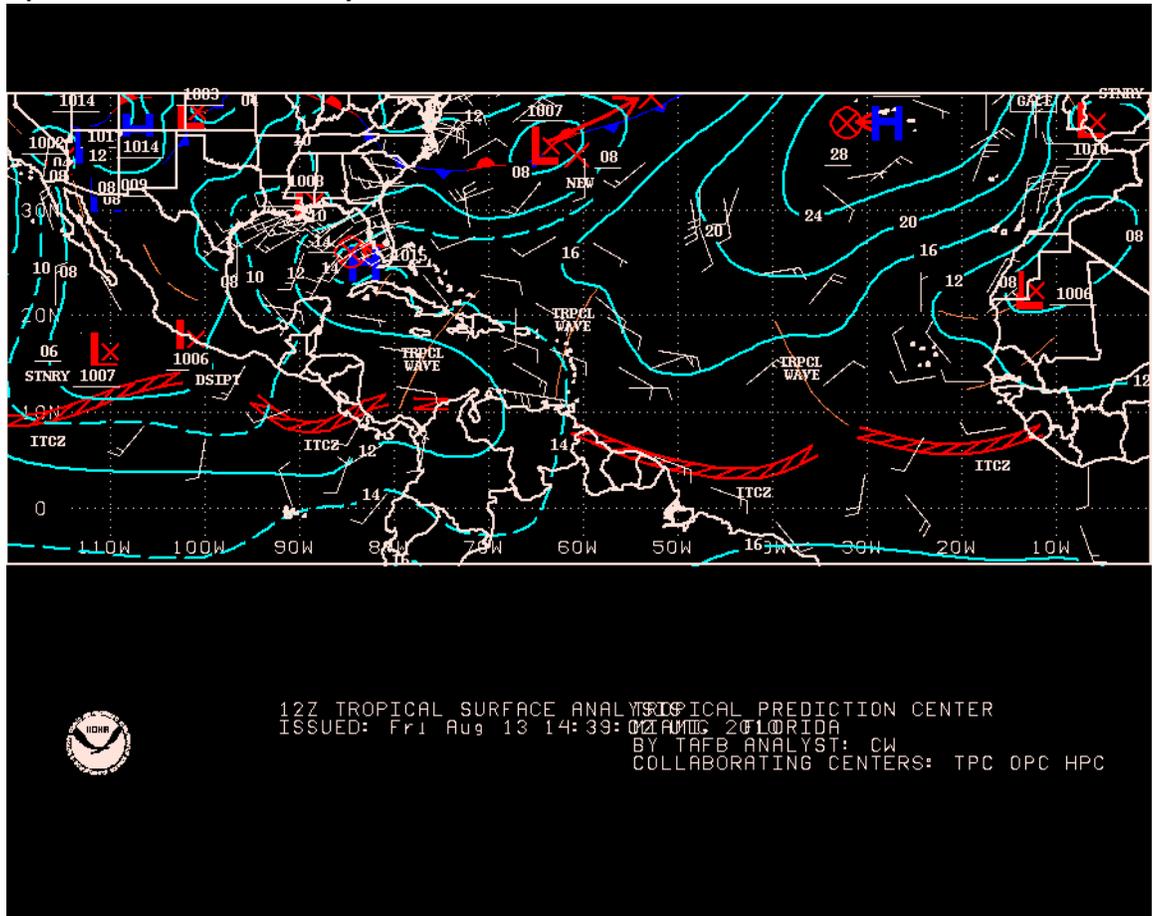
column below 600 hPa **(9)**. Regardless of the actual dust content in PGI-28L, convection remains vigorous.

Dry Air is expected to remain a dominant feature over the east Atlantic for the next several days while moving eastward into the central Atlantic. Analysis of the NCEP global model ensemble shows a probability of less than 10% that the relative humidity will reach 85% or greater at 850 hPa over the east/central Atlantic by 8/15 at 0000 UTC, and a similar situation exists for 8/16 at 0000UTC **(10)**. The GEOS-5 dust forecast **(12)** the emerging dust plume from West Africa, and advects it into the east Atlantic over the next several days. This dusty air mass is forecast to dissipate by the time it reaches the lesser Antilles, however areas in the central Atlantic north of 15N should experience high dust levels between now and the morning of 8/18 **(12)**. The combination of high dust and low relative humidity values will likely act to suppress convective activity in PGI-27L.

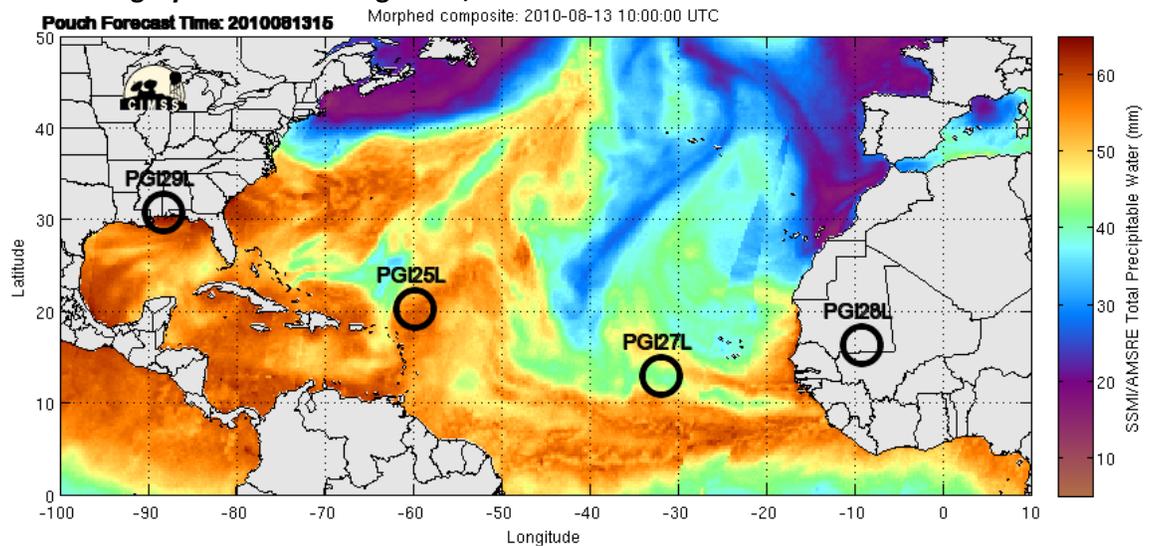
PGI-28L Is forecast to take a Northwest track as it exits the African continent. As the system crosses the Sahara desert, dust will continue to be a factor in the convective activity within PGI-28L. Ensemble forecasts from NCEP predict that 700 hPa RH values should remain above 70% at the predicted pouch location until 8/15 at 0000 UTC **(10)**. However, the likelihood of RH remaining above this threshold after the pouch exits the coast drops significantly. The GEOS-5 forecast for dust AOT suggests that this area will be highly dust loaded at the point where PGI-28L leaves the coast as well **(12)**. As the convection within PGI-28L tries to remain organized over the ocean, dust may play a role in the microphysics and the mesoscale convective organization.

Static Images used in discussion:

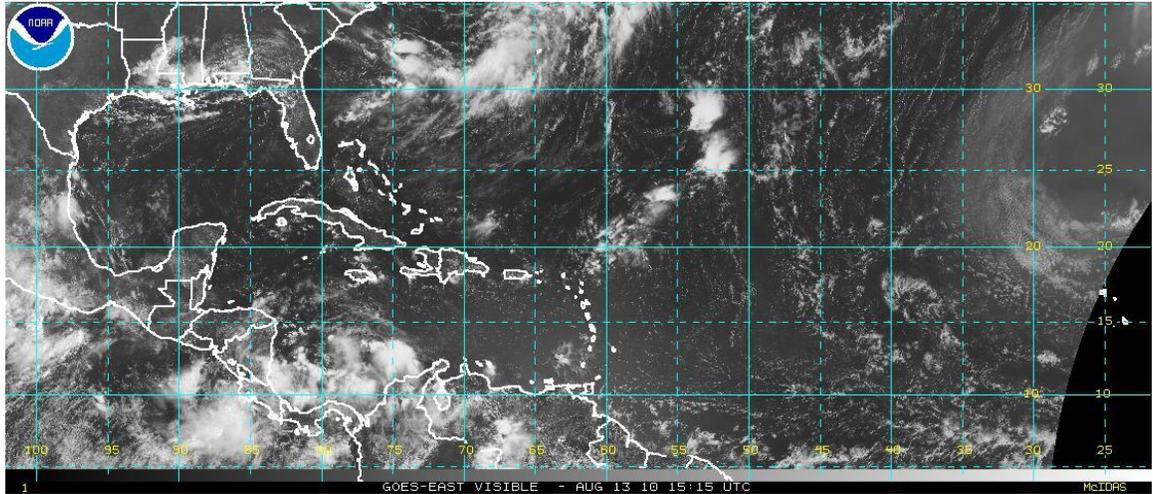
1) Updated 1200 UTC TPC analysis



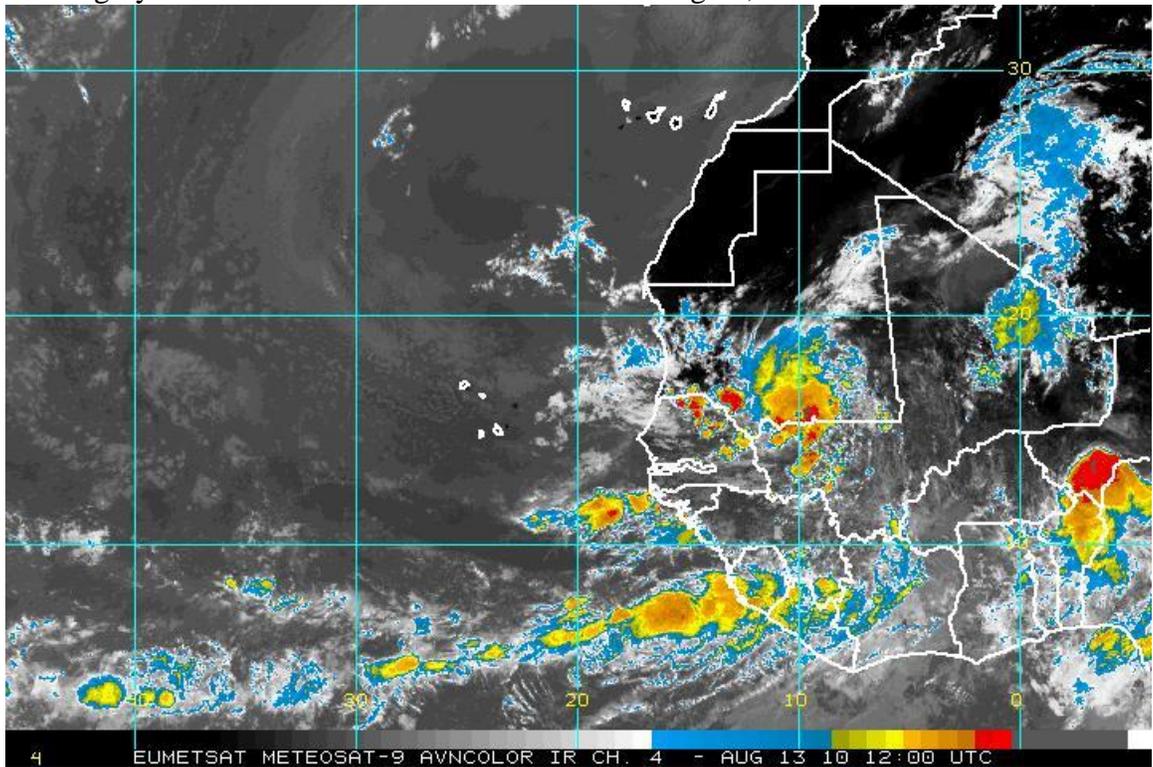
2) PREDICT Naming of Current Pouches in Atlantic Basin overlain on Total Precipitable Water Imagery at 0000 UTC August 13, 2010.



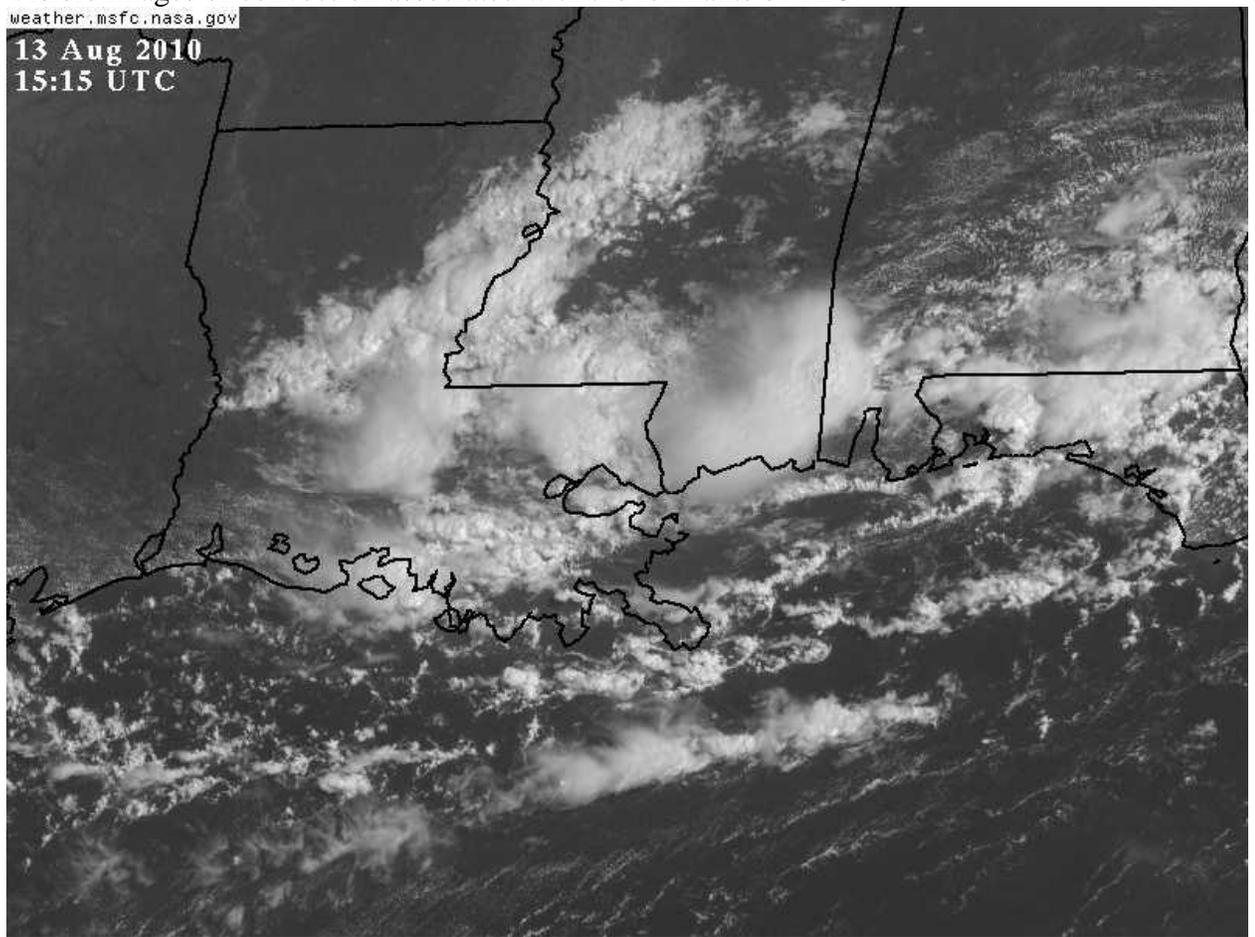
3) Visible Satellite Imagery- Wide Atlantic View from 15:15 UTC Aug 13, 2010



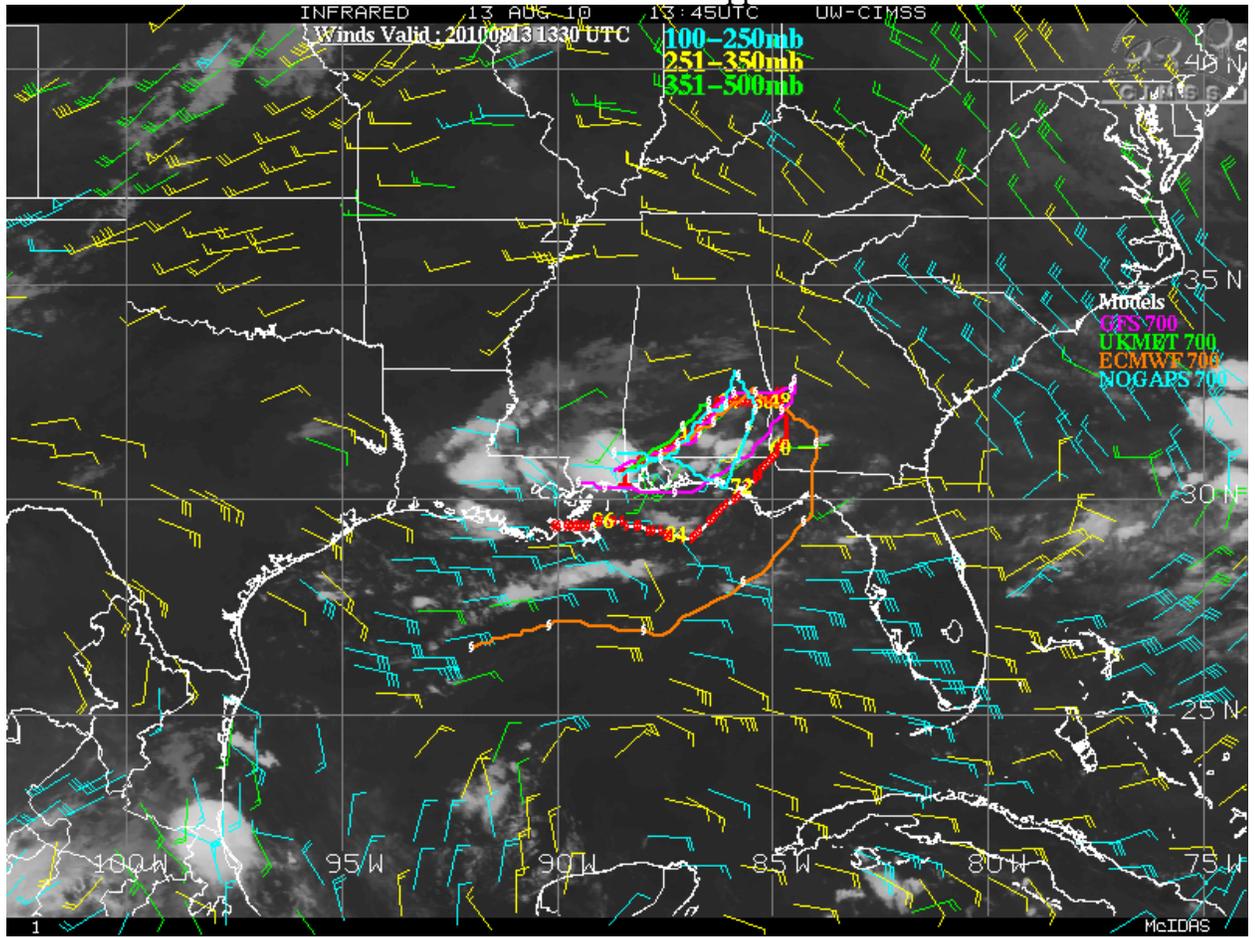
4) IR Imagery of Africa from Meteosat at 1200 UTC Aug 13, 2010



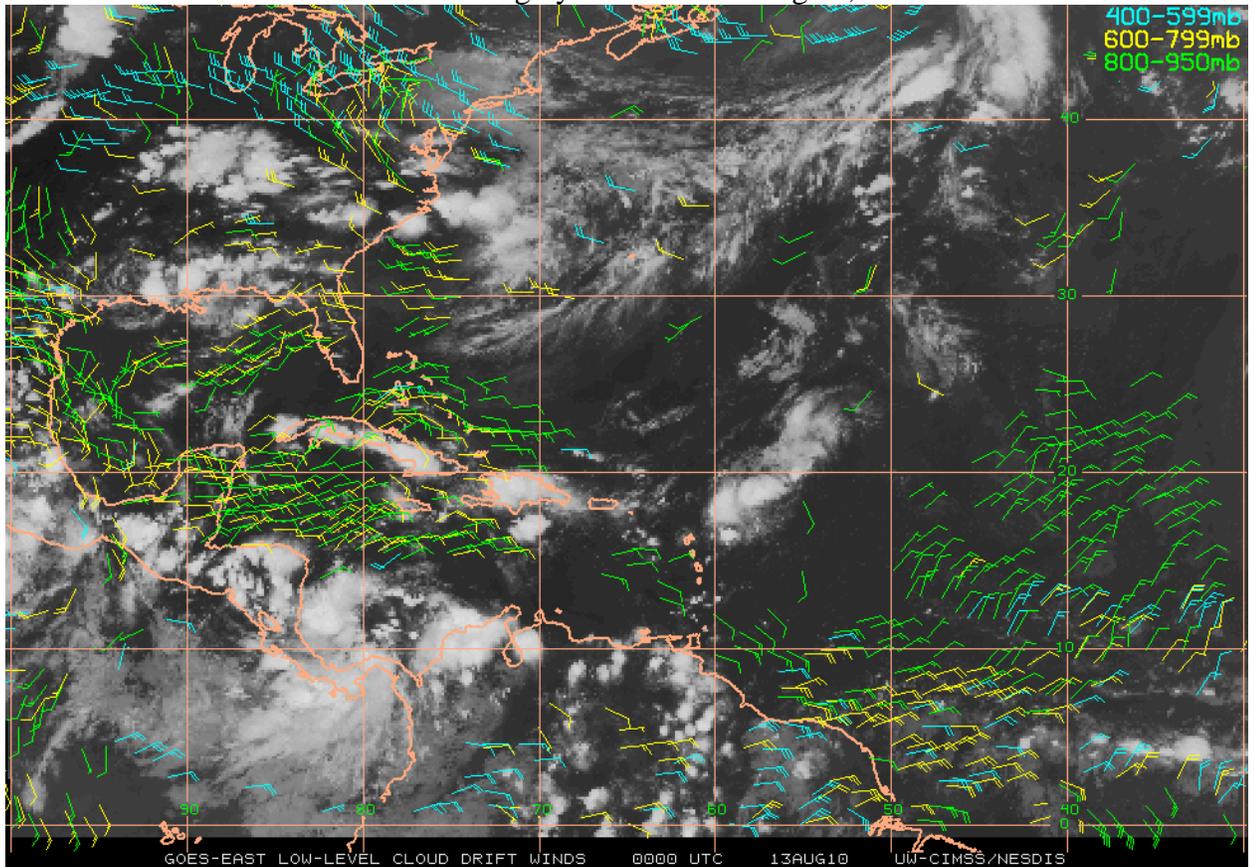
5) Visible images of convection associated with the remnants of TD5



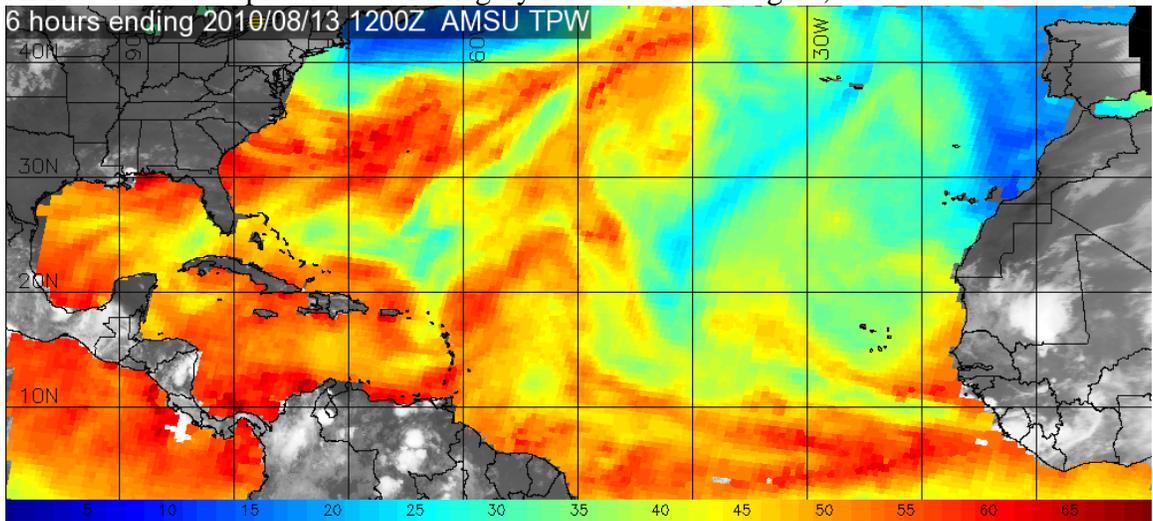
6) Model track forecasts for Ex-TD5 overlain on CIMSS Upper Level Winds



7) CIMSS Lower Level Winds and IR Imagery at 0000 UTC Aug 13, 2010

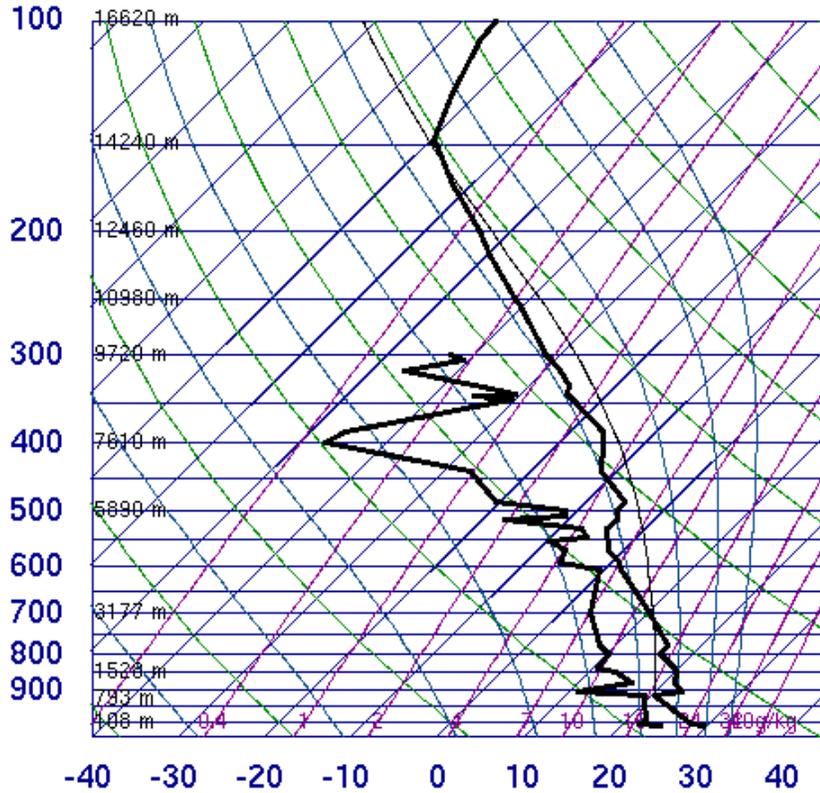


8) AMSU Total Precipitable Water Imagery for 1200 UTC Aug 13, 2010



9) Dakar 1200 UTC Sounding from Aug 13, 2010

61641 GOOY Dakar



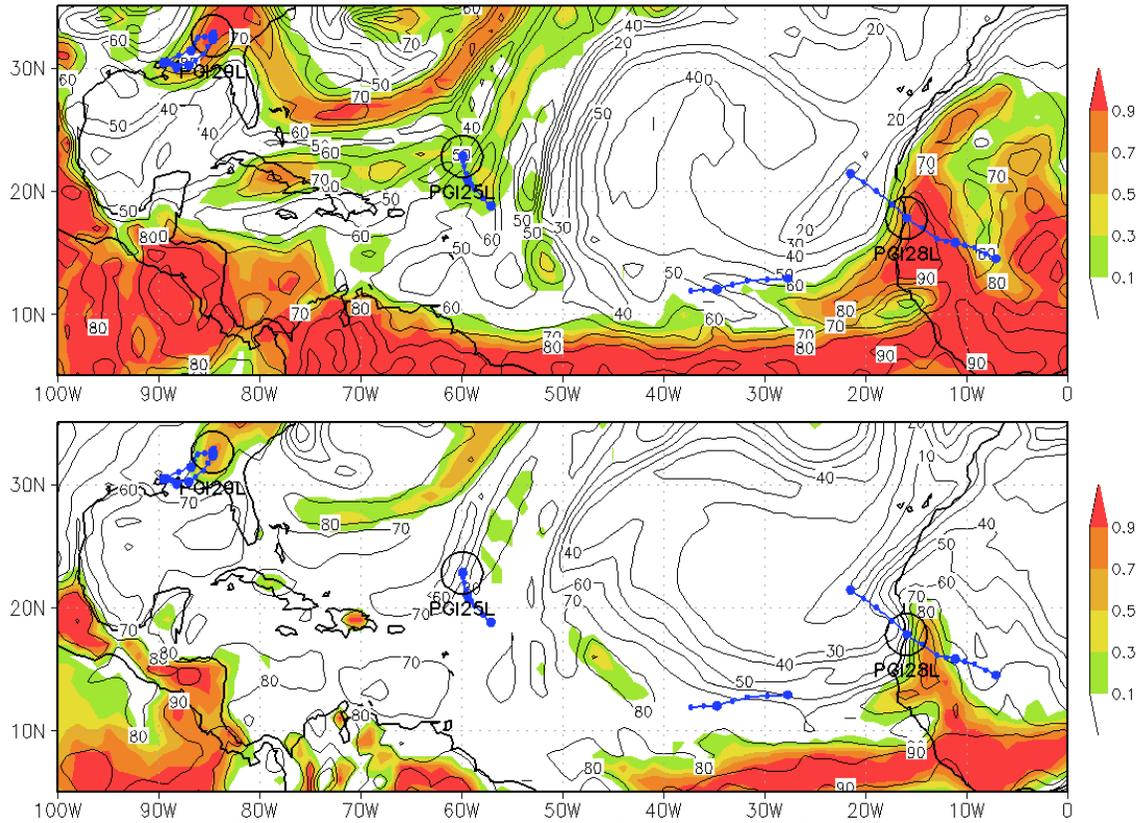
SLAT	14.73
SLON	-17.50
SELV	24.00
SHOW	0.86
LIFT	-2.47
LFTV	-2.97
SWET	178.3
KINX	31.70
CTOT	18.50
VTOT	25.50
TOTL	44.00
CAPE	994.1
CAPV	1136.
CINS	-4.55
CINV	-1.35
EQLV	159.9
EQTV	159.8
LFCT	916.5
LFCV	921.2
BRCH	21.24
BRCV	24.29
LCLT	293.8
LCLP	922.3
MLTH	300.7
MLMR	16.97
THCK	5782.
PWAT	49.27

12Z 13 Aug 2010

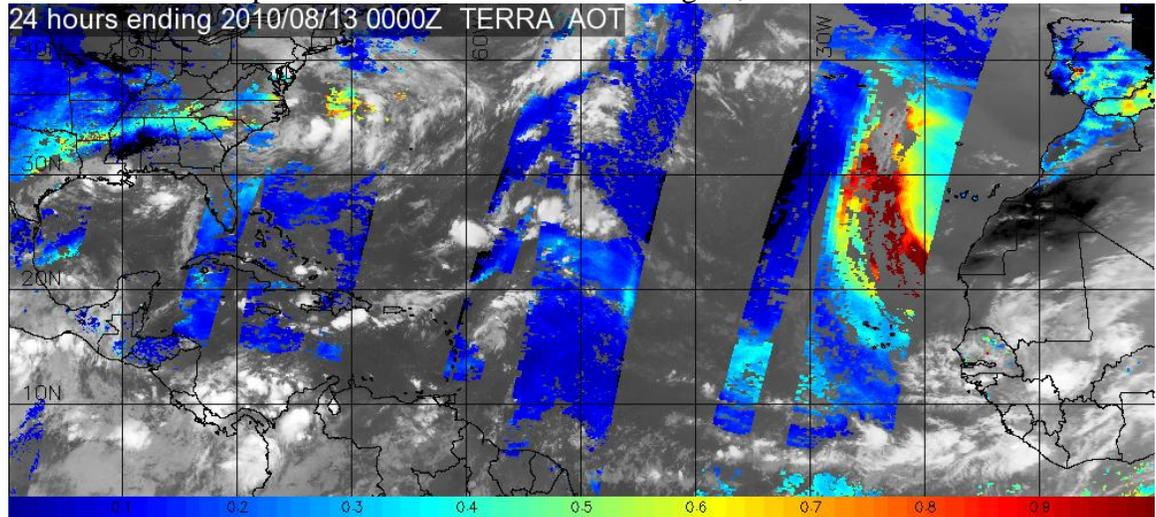
University of Wyoming

10) Pouch track 48 hr forecasts from the NCEP model run at 0000 UTC Aug 13, 2010

Contour: NCEP 48-h CTRL RH at (TOP) 700 hPa and (BOT) 850 hPa. Init. 2010081300, Valid 2010081500.
Shading: TOP: Prob(700 hPa RH > 70%). BOTTOM: Prob(850 hPa RH > 85%). 20 members.

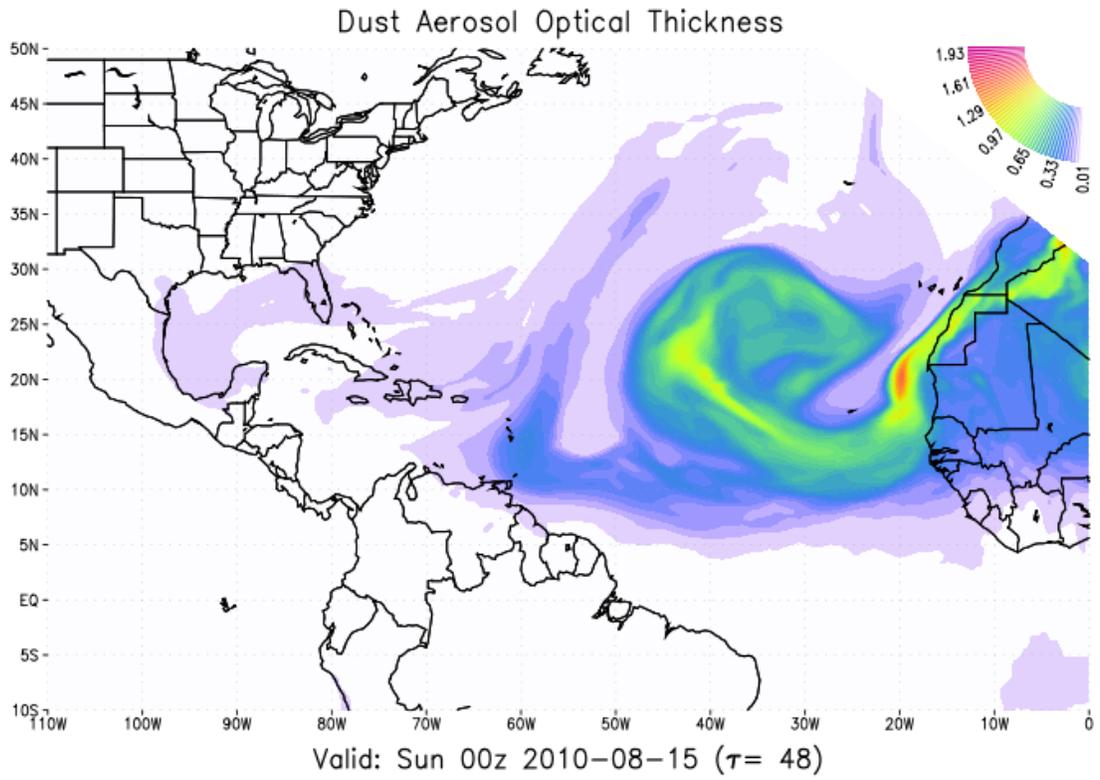


11) TERRA Aerosol Optical Thickness at 0000 UTC Aug 13, 2010

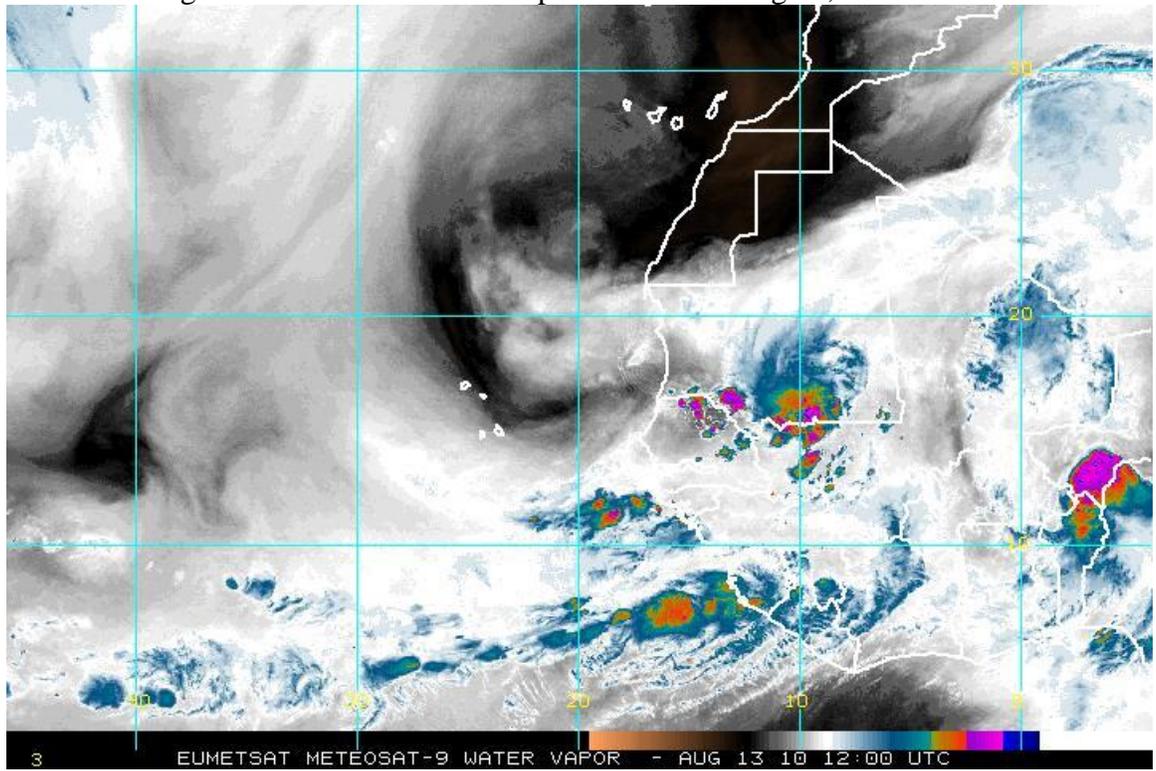


12) GEOS-5 model Dust Aerosol Optical Thickness forecast out 48 hours from 0000 UTC Aug 13, 231010

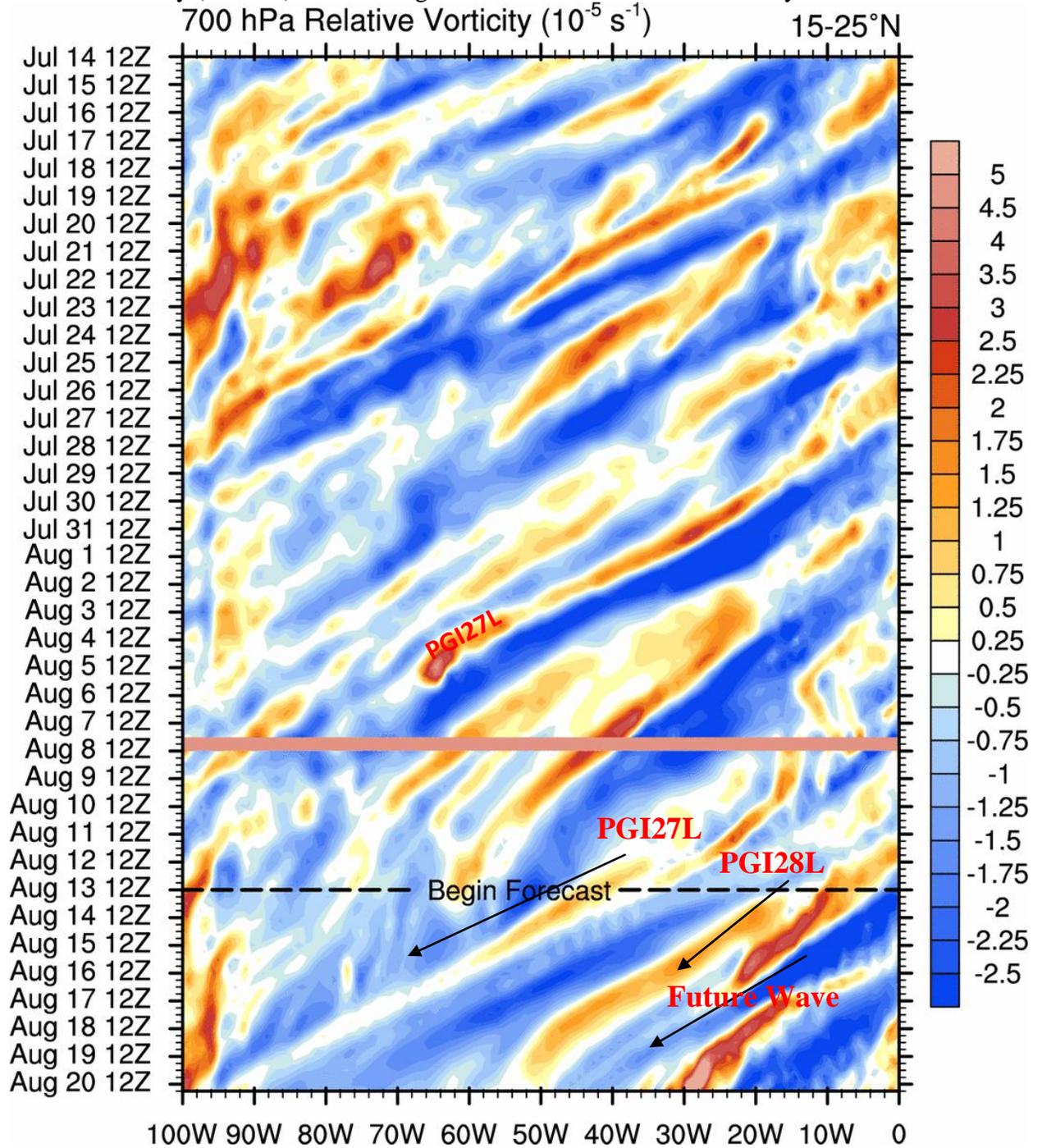
NASA/GSFC Global Modeling and Assimilation Office – GEOS-5 Forecast Initialized on 00z 2010-08-13



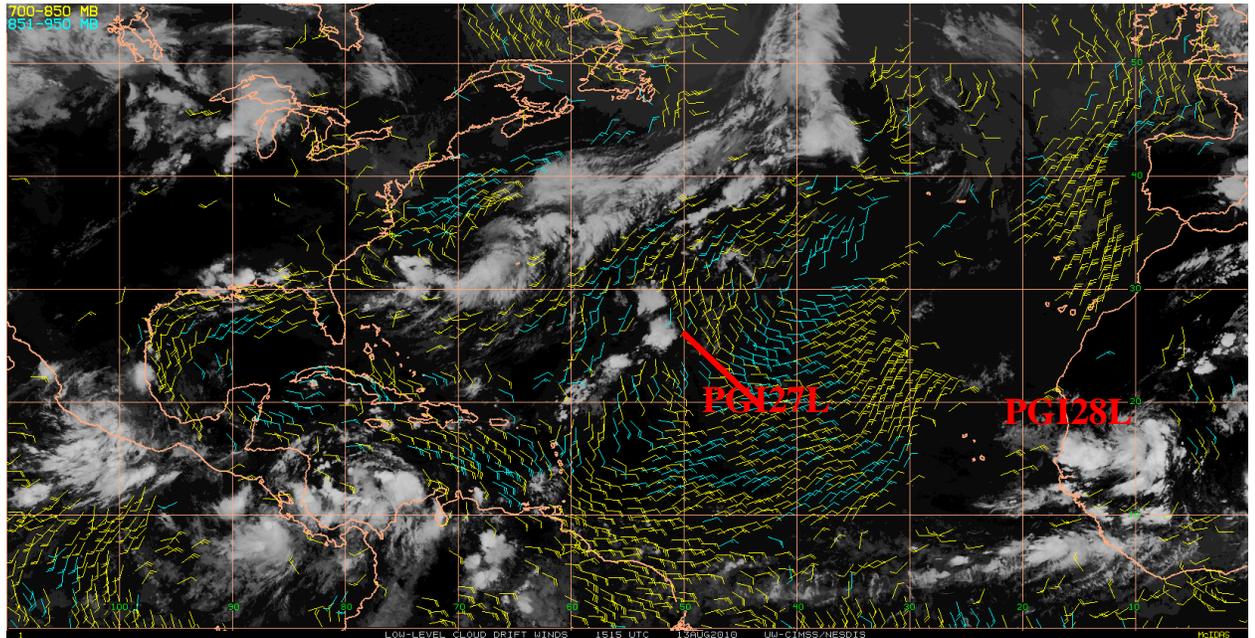
13) Meteosat Image of West Africa Water Vapor 1200 UTC Aug 13, 2010



14) 700 hPa vorticity (15-25N) valid at Aug. 13 0600UTC from SUNY Albany.



15) CIMSS Low-mid level winds and IR valid at Aug. 13 1315UTC.



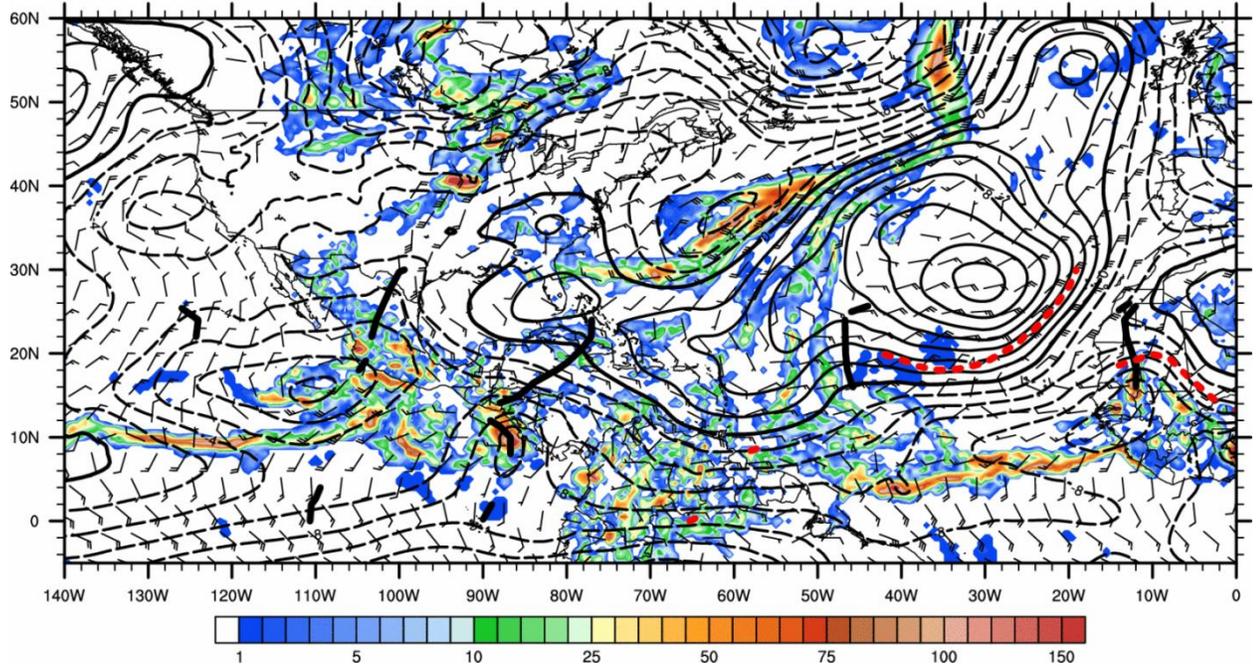
16) Rainrate, 700 hPa streamfunction, and 925 hPa winds. Init Aug. 13 0600UTC valid a) Aug. 16 0600 UTC, b) valid Aug. 16 0600 UTC, c) valid Aug. 16 0600 UTC.

a)

GFS Rainrate, 700 hPa Streamfunction, and 925 hPa Wind

RR (mm day⁻¹), Wind (barbs), Streamfunction (10⁶ m²s⁻¹, black contours)

Run: 13 Aug 06Z, Forecast: 24 hr, Valid: 14 Aug 06Z

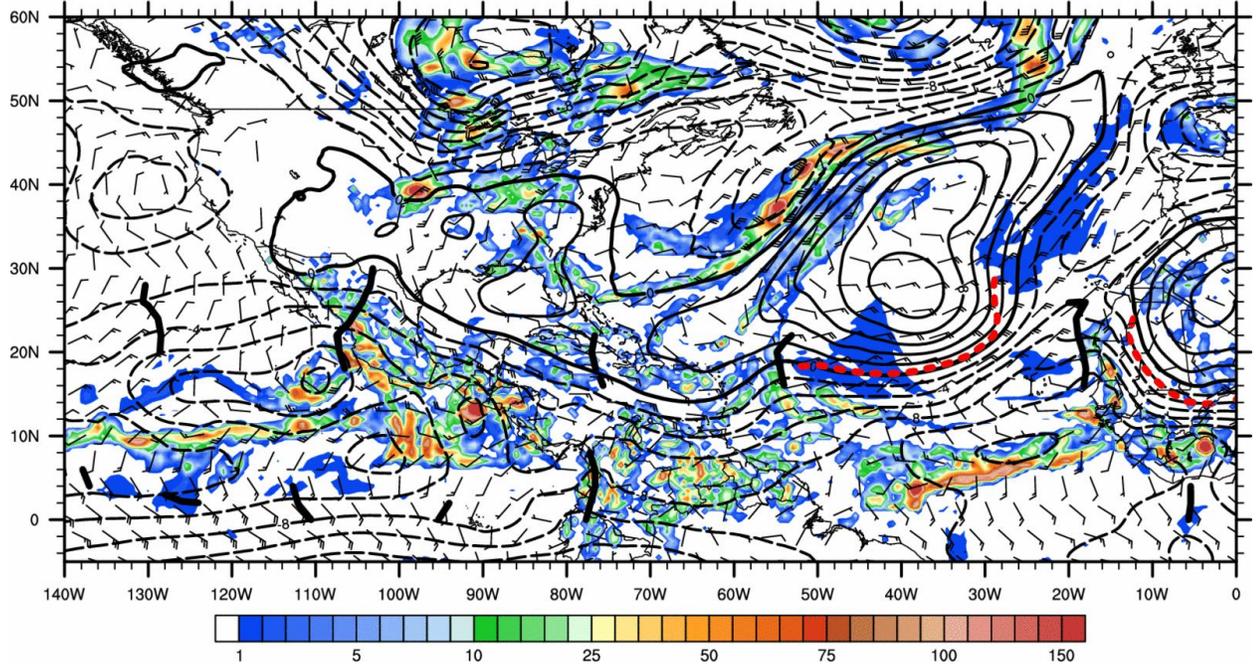


b)

GFS Rainrate, 700 hPa Streamfunction, and 925 hPa Wind

RR (mm day⁻¹), Wind (barbs), Streamfunction (10⁶ m²s⁻¹, black contours)

Run: 13 Aug 06Z, Forecast: 48 hr, Valid: 15 Aug 06Z

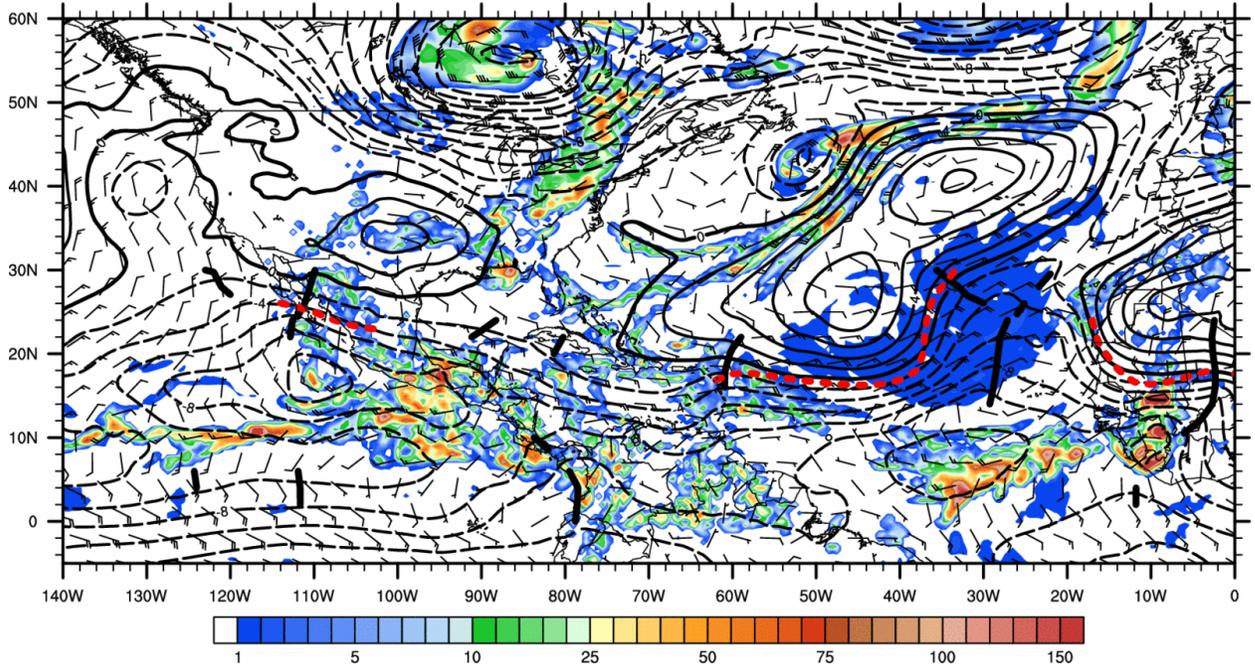


c)

GFS Rainrate, 700 hPa Streamfunction, and 925 hPa Wind

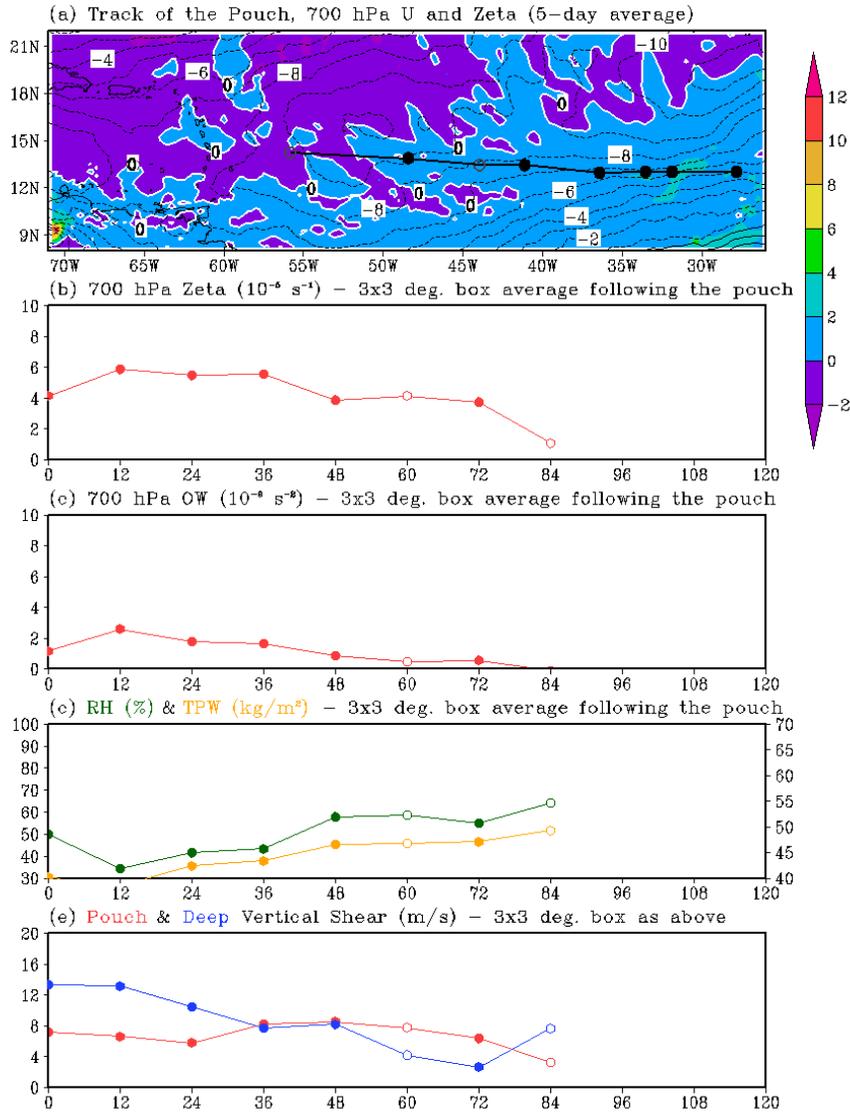
RR (mm day⁻¹), Wind (barbs), Streamfunction (10⁶ m²s⁻¹, black contours)

Run: 13 Aug 06Z, Forecast: 72 hr, Valid: 16 Aug 06Z



17) ECMWF pouch diagnostics for PGI27L initialized at Aug. 13 0000 UTC

PGI27L: 5-Day Forecast Based on ecmwf
 Initialized at 2010081300



18) Pouch diagnostics. PGI28L Aug. 13 0000 UTC

PGI28L: 5-Day Forecast Based on gfs

Initialized at 2010081300

